

MN3208

2048-STAGE LOW VOLTAGE OPERATION LOW NOISE BBD

■ General description

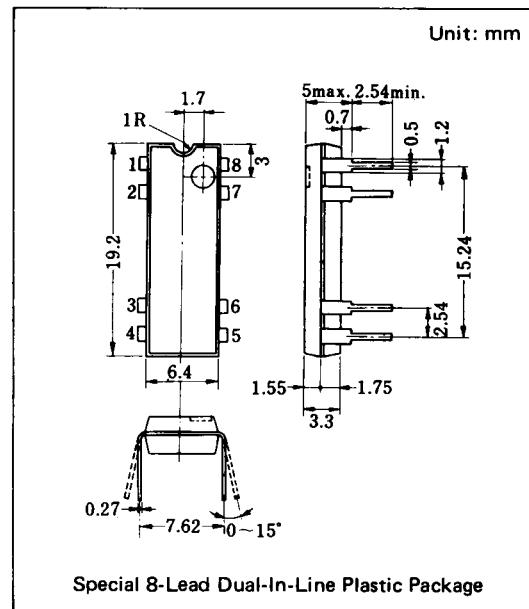
The NM3208 is a 2048-stage low voltage operation ($V_{DD} = 5V$) low noise BBD that provides a signal delay of up to 102.4ms and is suitable as a device for generation of reverberation effect of audio equipment such as stereo equipments.

■ Features

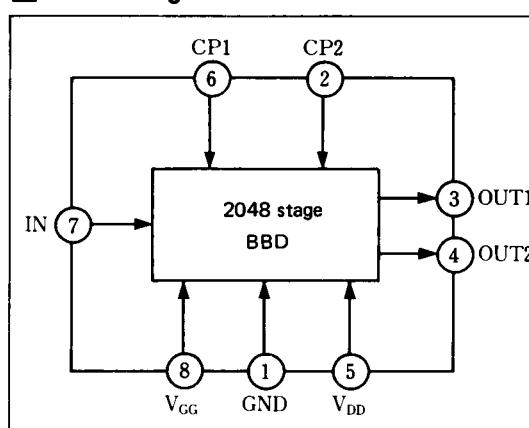
- Variable delay of audio signals: 10.24ms ~ 102.4ms.
- Wide supply voltage: 4 ~ 10V.
- Clock component cancellation capability.
- No insertion loss: $L_i = 0\text{dB}$ typ.
- Wide dynamic range: S/N = 71dB typ.
- Low distortion: THD = 0.5% typ. ($V_i = 0.25\text{Vrms}$)
- N-channel silicon gate process.
- Special 8-lead dual-in-line plastic package.

■ Applications

- Reverberation and echo effects of audio equipment such as radio cassette recorder, car radio, portable radio, portable stereo, echo microphone and pre-taped musical accompaniment (Karaoke), etc.
- Sound effect in electronic musical instruments.
- Variable or fixed delay of analog signals.
- Telephone time compression and delay line for voice communication system.



■ Block Diagram



■ Quick Reference Data

Item	Symbol	Value	Unit
Supply Voltage	V_{DD}, V_{GG}	$+5, \frac{14}{15}V_{DD}$	V
Signal Delay Time	t_D	10.24~102.4	ms
Total Harmonic Distortion	THD	0.5	%
Signal to Noise Ratio	S/N	71	dB

■ Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Terminal Voltage	V_{DD} , V_{GG} , V_{CP} , V_I	−0.3~+11	V
Output Voltage	V_O	−0.3~+11	V
Operating Temperature	T_{opr}	−20~+60	°C
Storage Temperature	T_{stg}	−55~+125	°C

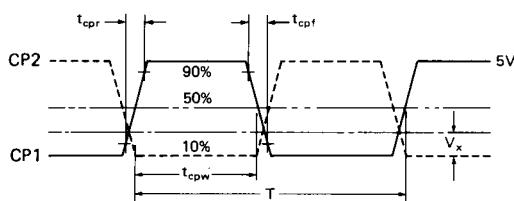
■ Operating Condition (Ta = 25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain Supply Voltage	V_{DD}		+4	+5	+10	V
Gate Supply Voltage	V_{GG}			$\frac{14}{16}V_{DD}$		V
Clock Voltage "H" Level	V_{CPH}			V_{DD}		V
Clock Voltage "L" Level	V_{CPL}		0		+1	V
Clock Frequency	f_{CP}		10		100	kHz
Clock Pulse Width *1	t_{CPW}				0.5T *2	
Clock Rise Time *1	t_{CP_r}				500	ns
Clock Fall Time *1	t_{CP_f}				500	ns
Clock Input Capacitance	C_{CP}				1400	pF
Clock Cross Point *1	V_x		0		$0.3V_{CPH}$	V

■ Electrical Characteristics ($T_a=25^\circ\text{C}$, $V_{DD}=V_{CPH}=+5\text{V}$, $V_{CPL}=0\text{V}$, $V_{GG}=\frac{14}{15}V_{DD}$, $R_L=100\text{k}\Omega$)

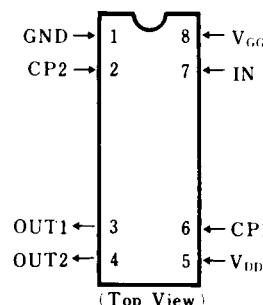
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Signal Delay Time	t_D		10.24		102.4	ms
Input Signal Frequency	f_i	$f_{CP} = 40\text{kHz}$, 3dB down (0dB at $f_i = 1\text{kHz}$)	9			kHz
Input Signal Swing	V_i	THD=2.5%	0.36			Vrms
Insertion Loss	L_i	$f_{CP}=40\text{kHz}$, $f_i=1\text{kHz}$	-4	0	4	dB
Total Harmonic Distortion	THD	$f_{CP}=40\text{kHz}$, $f_i=1\text{kHz}$, $V_i=0.25\text{Vrms}$		0.5	2.5	%
Noise	V_{no}	$f_{CP} = 100\text{kHz}$ Weighted by "A" curve			0.3	mVrms
Signal To Noise Ratio	S/N			71		dB

*1 Clock Pulse Waveforms

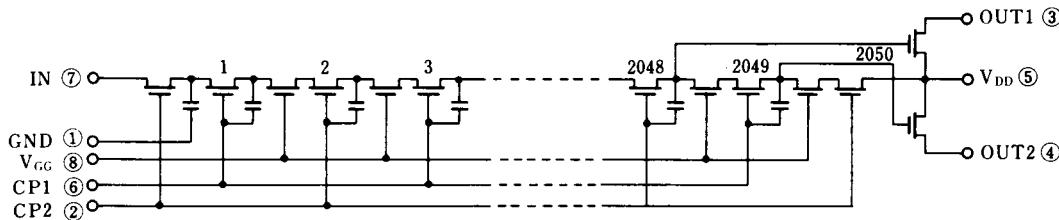


* $2 T = 1/f_{CP}$ (Clock Period)

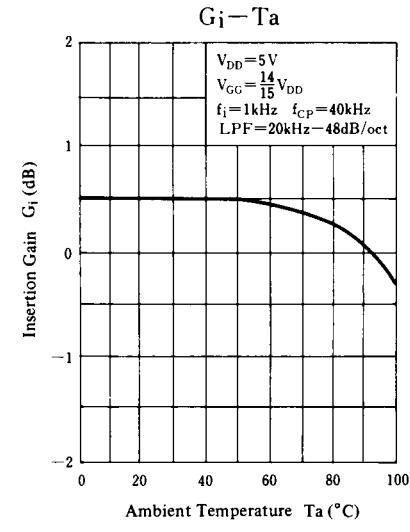
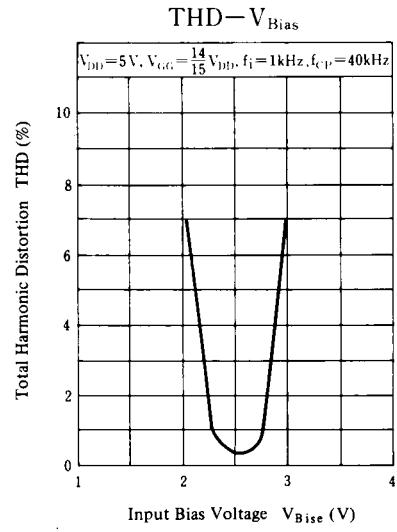
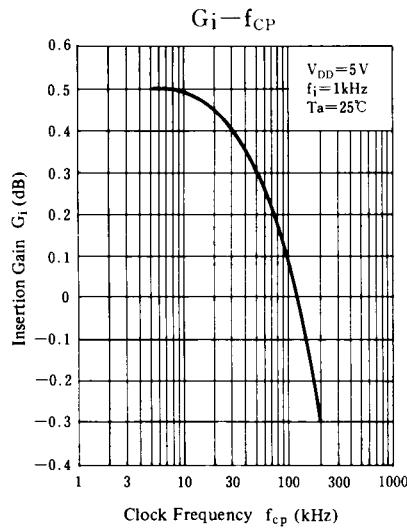
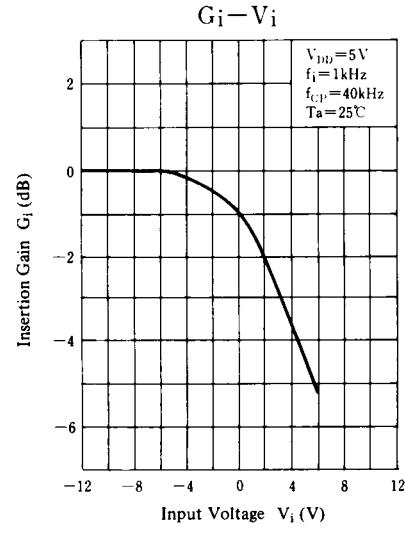
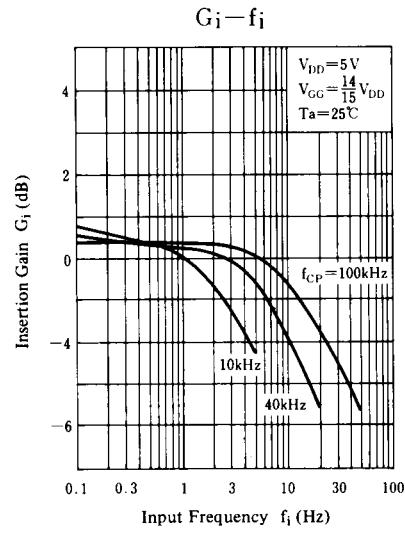
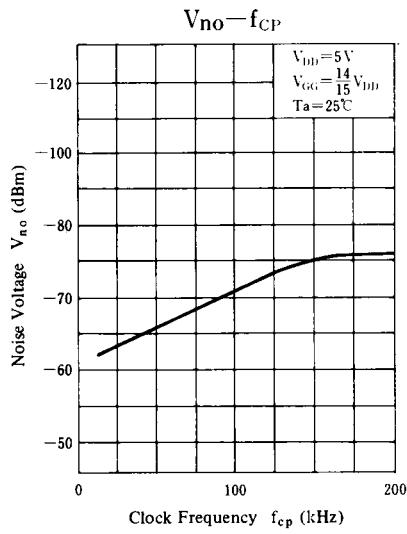
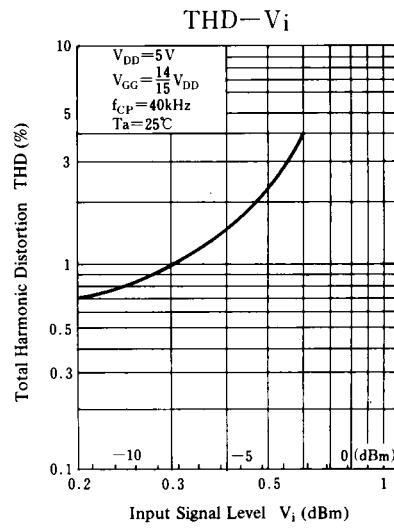
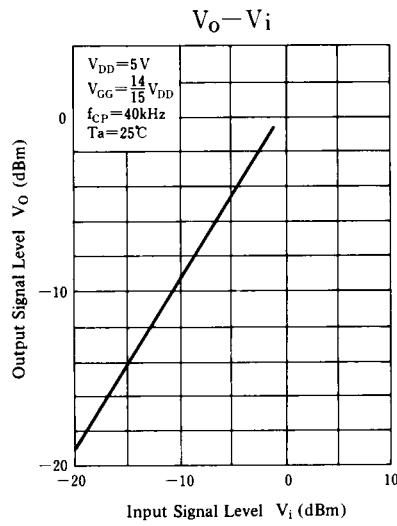
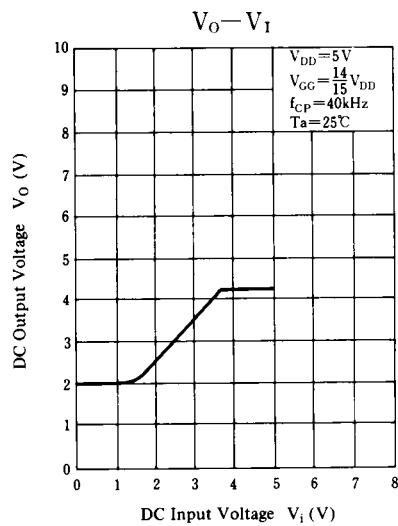
■ Terminal Assignments

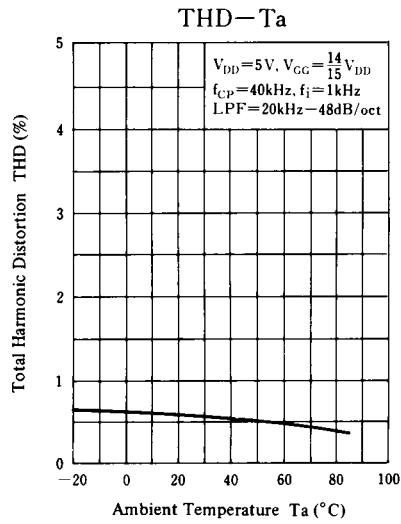
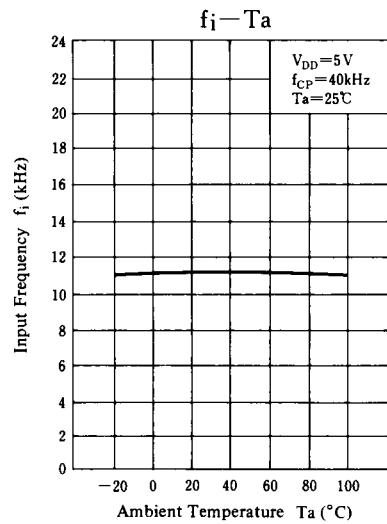
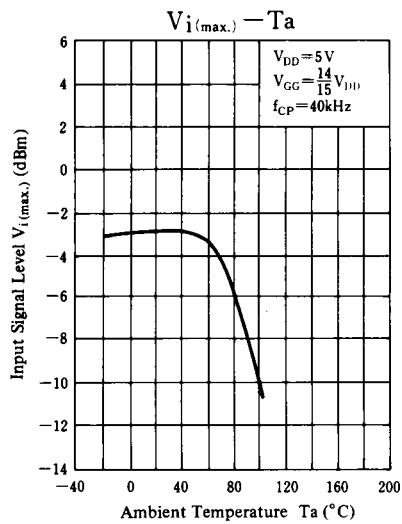


■ Circuit Diagram

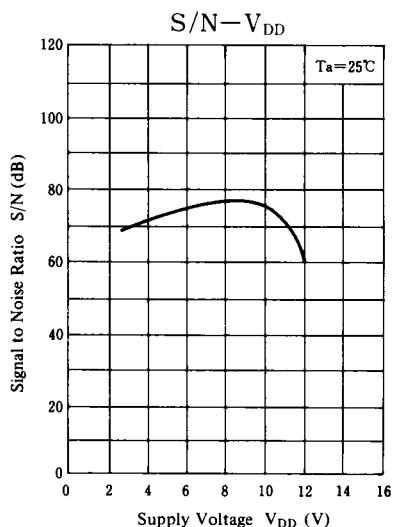
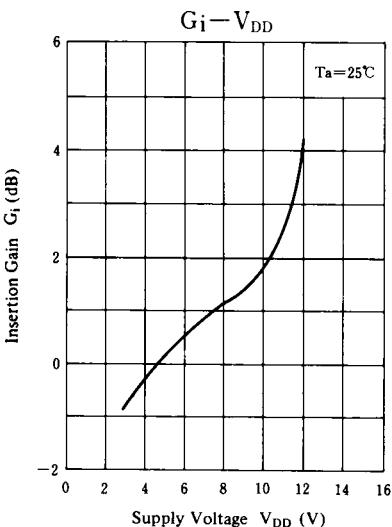
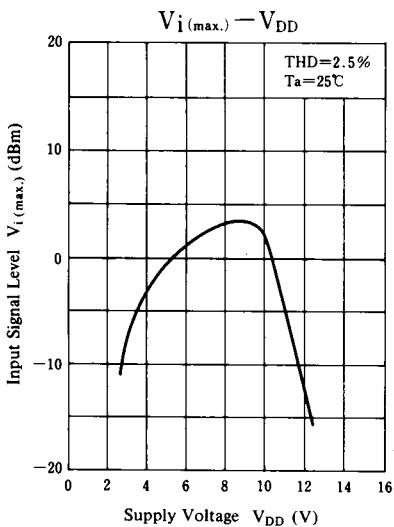
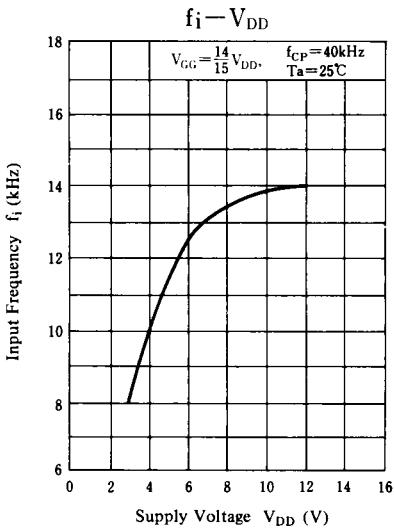
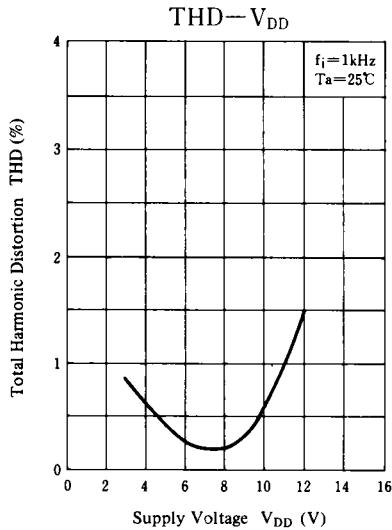
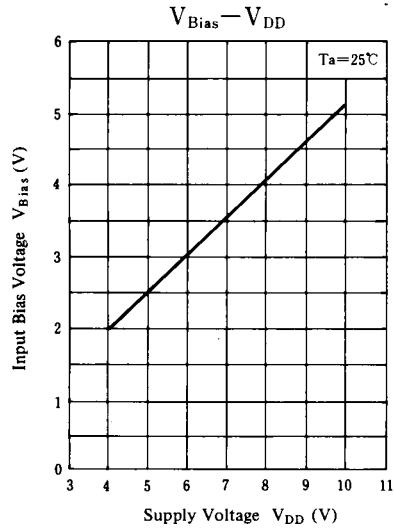


■ Typical Electrical Characteristic Curves

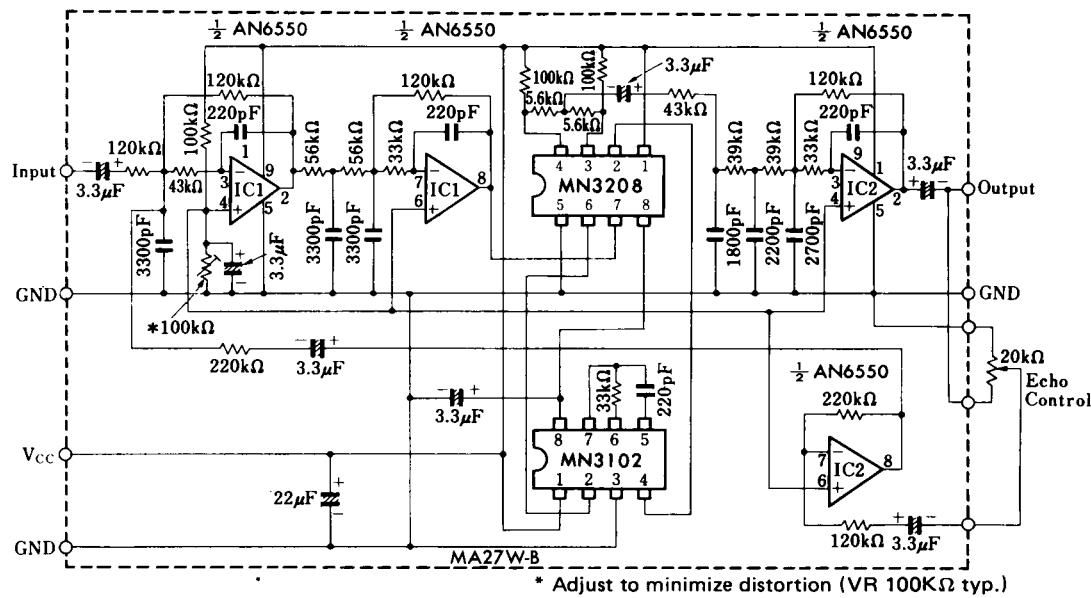




■ Supply Voltage Characteristics



■ Application Circuit



Reverberation Effect Generation Circuit (Signal Delay Over 100msec.)